H. NOISE

This section describes the existing noise environment of the North Park Street Code area and its environs, and provides a discussion of the noise impacts that would result from implementation of the proposed North Park Street Code.

1. SETTING

This setting section provides a brief introduction to noise terminology, an overview of existing noise conditions, and noise related regulatory considerations.

Fundamentals of Acoustics

Noise is generally defined as sound that is loud, disagreeable, or unexpected. Sound, as described in more detail below, is mechanical energy transmitted in the form of a wave because of a disturbance or vibration.

Amplitude

Amplitude is the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person (US EPA, 1971).

Frequency

Frequency is the number of fluctuations of the pressure wave per second. The unit of frequency is the Hertz (Hz). One Hz equals one cycle per second. The human ear is not equally sensitive to sound of different frequencies. Sound waves below 16 Hz or above 20,000 Hz cannot be heard at all, and the ear is more sensitive to sound in the higher portion of this range than in the lower. To approximate this sensitivity, environmental sound is usually measured in A-weighted decibels (dBA). On this scale, the normal range of human hearing extends from about 10 dBA to about 140 dBA (US EPA, 1971).

Characteristics of Sound Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources, such as automobiles, trucks and airplanes, and stationary sources, such as construction sites, machinery, and industrial operations. Noise generated by mobile sources typically attenuates at a rate between 3.0 to 4.5 dBA per doubling of distance. The rate depends on the ground surface and the number or type of objects between the noise source and the receiver. Mobile transportation sources, such as highways and hard and flat surfaces, such as concrete or asphalt, have an attenuation rate of 3.0 dBA per doubling of distance. Soft surfaces, such as uneven or vegetated terrain, have an attenuation rate of about 4.5 dBA per doubling of distance from the source. Noise generated by stationary sources typically

attenuates at a rate of approximately 6.0 to 7.5 dBA per doubling of distance from the source (US EPA, 1971).

Sound levels can be reduced by placing barriers between the noise source and the receiver. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver. Buildings, concrete walls, and berms can all act as effective noise barriers. Wooden fences or broad areas of dense foliage can also reduce noise, but are less effective than solid barriers.

Noise Descriptors

The selection of a proper noise descriptor for a specific source is dependent upon the spatial and temporal distribution, duration, and fluctuation of the noise. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise include the average-hourly noise level (in L_{eq}) and the average-daily noise levels (in L_{dn}/CNEL). Common acoustical terms and descriptors are summarized in **Table H-1**.

TABLE H-1
COMMON ACOUSTICAL TERMS AND DESCRIPTORS

Descriptor	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise or sound at a given location, typically defined by the L_{eq} level.
Noise	Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
Decibel (dB)	A unit-less measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to referenced sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels which approximates the frequency response of the human ear.
Energy Equivalent Noise Level (L_{eq})	The energy mean (average) noise level. The instantaneous noise levels during a specific period of time in dBA are converted to relative energy values. From the sum of the relative energy values, an average energy value (in dBA) is calculated.
Minimum Noise Level (L_{min})	The minimum instantaneous noise level during a specific period of time.
Maximum Noise Level (L_{max})	The maximum instantaneous noise level during a specific period of time.
Day-Night Average Noise Level (DNL or L_{dn})	The 24-hour L_{eq} with a 10 dBA "penalty" for noise events that occur during the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. In other words, 10 dBA is "added" to noise events that occur in the nighttime hours to account for increases sensitivity to noise during these hours.
Community Noise Equivalent Level (CNEL)	The CNEL is similar to the L_{dn} described above, but with an additional 5 dBA "penalty" added to noise events that occur between the hours of 7:00 p.m. to 10:00 p.m. The calculated CNEL is typically approximately 0.5 dBA higher than the calculated L_{dn}.
Single Event Level (SEL)	The level of sound accumulated over a given time interval or event. Technically, the sound exposure level is the level of the time-integrated mean square A-weighted sound for a stated time interval or event, with a reference

Descriptor	Definition
	time of one second. Often also referred to as the single event noise exposure level (SENEL).

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels. Typical community noise levels are depicted in **Table H-2**.

TABLE H-2
TYPICAL A-WEIGHTED SOUND LEVELS OF COMMON NOISE SOURCES

Decibels	Description
130	Threshold of pain
120	Jet aircraft take-off at 100 feet
110	Riveting machine at operator's position
100	Shotgun at 200 feet
90	Bulldozer at 50 feet
80	Diesel locomotive at 300 feet
70	Commercial jet aircraft interior during flight
60	Normal conversation speech at 5-10 feet
50	Open office background level
40	Background level within a residence
30	Soft whisper at 2 feet
20	Interior of recording studio

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged. Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans.

- Outside of the laboratory, a 3-dB change is considered a just-perceivable difference.

- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial.

- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Fundamentals of Groundborne Vibration

Sources of earth-borne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or manmade causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous, such as factory machinery, and transient, such as explosions. As is the case with airborne sound, earth-borne vibrations may be described by amplitude and frequency.

Vibration Descriptors

Vibration is an oscillatory motion which can be described in terms of the displacement, velocity, or acceleration. Because the motion is oscillatory, there is no net movement of the vibration element and the average of any of the motion descriptors is zero. Displacement is the easiest descriptor to understand. For a vibrating floor, the displacement is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement and acceleration is the rate of change of the speed. Although displacement is easier to understand than velocity or acceleration, it is rarely used for describing groundborne vibration. Most transducers used for measuring groundborne vibration use either velocity or acceleration. Furthermore, the response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.

Several descriptors can be used to quantify vibration amplitude. The peak particle velocity (ppv) is defined as the maximum instantaneous positive or negative peak of the vibration signal. Peak particle velocity is often used in monitoring of blasting vibration since it is related to the stresses that are experienced by buildings. Although peak particle velocity is appropriate for evaluating the potential of building damage, it is not suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. Because the net average of a vibration signal is zero, the root mean square (rms) amplitude is used to describe the "smoothed" vibration amplitude. The root mean square of a signal is the square root of the average of the squared amplitude of the signal. The average is typically calculated over a one-second period. The ppv and rms velocity are normally described in inches per second in the United States and meters per second in the rest of the world.

Effects of Noise on People

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of

loudness is relatively predictable and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels in decibels.

Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}) over a given time period (usually one hour). The L_{eq} is the foundation of the Day-Night Average Level noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The Day-Night Average Level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Noise in the community has been cited as being a health problem, not in terms of actual physiological damages such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities such as sleep, speech, recreation, and tasks demanding concentration or coordination. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases and the acceptability of the environment for people decreases. This decrease in acceptability and the threat to public well-being are the basis for policies preventing exposures to excessive community noise levels.

To control noise from fixed sources which have developed from processes other than zoning or land use planning, many jurisdictions have adopted community noise control ordinances. Such ordinances are intended to abate noise nuisances and to control noise from existing sources. They may also be used as performance standards to judge the creation of a potential nuisance or potential encroachment of sensitive uses upon noise-producing facilities. Community noise control ordinances are generally designed to resolve noise problems on a short-term basis (usually by means of hourly noise level criteria), rather than on the basis of 24-hour or annual cumulative noise exposures.

In addition to the A-weighted noise level, other factors should be considered in establishing criteria for noise sensitive land uses. For example, sounds with noticeable tonal content such as whistles, horns, or droning or high-pitched sounds may be more annoying than the A-weighted sound level alone suggests. Many noise standards apply a penalty, or correction, of 5 dBA to such sounds. The effects of unusual tonal content are generally more of a concern at nighttime, when residents may notice the sound in contrast to low levels of background noise.

Audibility of a new noise source and/or increases in noise levels within recognized acceptable limits are not usually considered to be significant noise impacts, but these concerns should be addressed and considered in the planning and environmental review processes.

Existing Noise Conditions in the City

The primary noise source in the City of Alameda comes from passing overhead aircraft, with surface traffic noise generated by traffic on local streets considered secondary. Each of these noise sources is discussed individually below.

Transportation Noise Sources

Airports

Prior to the closure of Naval Air Station Alameda in 1997 (now Alameda Point), aircraft operations at the naval base contributed to ambient noise levels in the city. Since the closure, there are no active use airports remaining within the City. Aircraft noise from the Oakland International Airport and the San Francisco International Airport, although outside of the city, do contribute to ambient noise levels throughout Alameda (Northern Waterfront General Plan Amendment, 2006). The greatest airport noise affecting Alameda residents from Oakland Airport is in the Bayfarm Island area. Through a settlement with the Port of Oakland, residents within the specific affected contour area were part of a noise insulation program to reduce exposure.

Roadway Traffic Noise Levels

The Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) with the Calveno vehicle noise emission curves was used to predict traffic noise levels within the City of Alameda. The FHWA Model is the traffic noise prediction model currently preferred by the Federal Highway Administration, the State of California Department of Transportation (Caltrans), and most city and county governments for use in traffic noise assessment. Although the FHWA Model is in the process of being updated by a more sophisticated traffic noise prediction model, the use of RD-77-108 is considered acceptable for the development of transportation element traffic noise predictions.

Non-Transportation Noise Sources

The production of noise is a result of many processes and activities, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by federal and state employee health and safety regulations (OSHA), but exterior noise levels may exceed locally acceptable standards. Commercial, recreational, and public service facility activities can also produce noise which affects adjacent sensitive land uses.

From a land use planning perspective, fixed-source noise control issues focus upon two goals: to prevent the introduction of new noise-producing uses in noise-sensitive areas and to prevent encroachment of noise-sensitive uses upon existing noise-producing facilities. The first goal can be achieved by applying noise performance standards to proposed new noise-producing uses. The second goal can be met by

requiring that new noise-sensitive uses in proximity to noise-producing facilities include mitigation measures to ensure compliance with those noise performance standards.

General types existing fixed noise sources in the City of Alameda include general commercial and light industrial uses, such as automotive and truck repair facilities, tire installation centers, car washes, loading docks, and corporation yards, which are found mainly within relatively close proximity to Webster Street and Park Street within the City of Alameda. Additionally, parks and school playing fields, which are effectively spread throughout the city, also generate varying degrees of noise generation depending on the age and number of people utilizing the respective facilities at a given time and the types of activities they are engaged in.

c. Regulatory Framework

Federal

Environmental Protection Agency

In 1974, in response to the requirements of the Federal Noise Control Act of 1972 (Public Law 92-574), the EPA identified indoor and outdoor noise limits to protect public health and welfare. L_{dn} limits of 55 dB outdoors and 45 dB indoors are identified as desirable to protect against speech interference and sleep disturbance for residential, educational, and healthcare areas. Sound-level criteria identified to protect against hearing damage in commercial and industrial areas are 24-hour L_{eq} values of 70 dB (both indoors and outdoors).

State

State Governor's Office of Planning and Research General Plan Guidelines

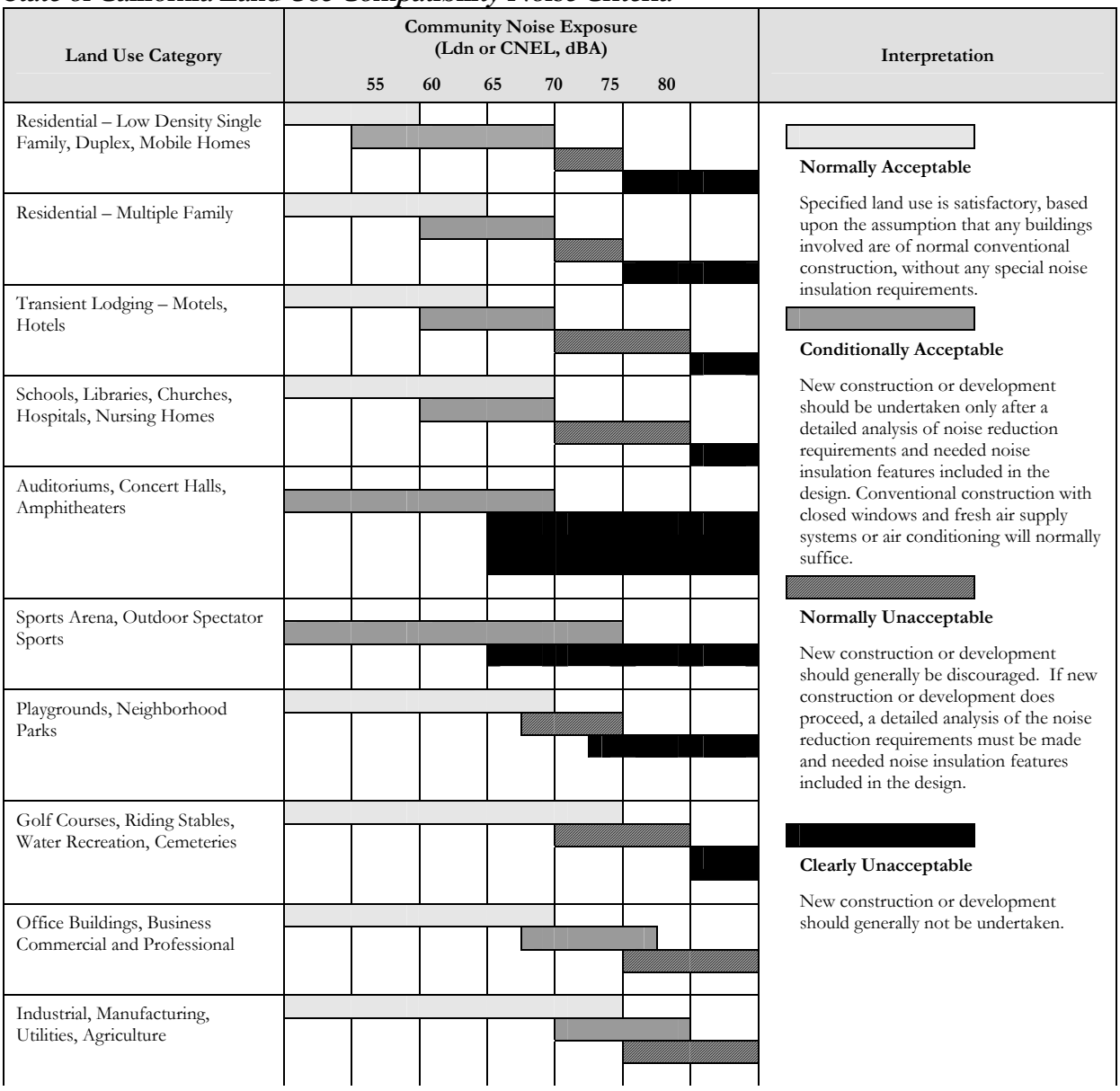
The State of California General Plan Guidelines (State of California 2002), published by the State Governor's Office of Planning and Research, provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. The state's recommended noise criteria are summarized in Table H-3. A "conditionally acceptable" designation implies that new construction or development should be undertaken only after a detailed analysis of the noise reduction measures is made and needed noise insulation features incorporated. Incorporation of heating, ventilation, and air conditioning systems into the building design to facilitate the closure of windows is typically considered sufficient to mitigate interior noise levels for sites located within "conditionally acceptable" noise regions. Development is typically considered "normally unacceptable" in areas exceeding 70 dBA CNEL/L_{dn}. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

California Building Code

Environmental noise intrusion into new multi-family housing is regulated by Appendix Chapter 12, Section 1208, Sound Transmission Control in the 2001 California Building Code. Interior noise

levels attributable to exterior sources shall not exceed 45 dBA L_{dn} in any habitable room. Multi-family residential proposed in noise environments exceeding 60 dBA L_{dn} require an acoustical analysis showing that the proposed design will limit exterior noise to the prescribed allowable interior level.

Table H-3
State of California Land Use Compatibility Noise Criteria



Source: California GOPR, 2003

Local

City of Alameda General Plan

The City's currently adopted Health and Safety Element establishes policies and regulations concerning the generation and control of noise that could adversely affect its citizens and noise-sensitive land uses. The following noise policies, as they relate to the proposed project, have been established by the City and are listed in the General Plan, as amended in 2006.

8.7.h In making a determination of impact under the California Environmental Quality Act (CEQA), consider the following impacts to be "significant":

- *An increase in noise exposure of 4 or more dB if the resulting noise level would exceed that described as normally acceptable for affected land use, as indicated in Table 8-1.*
- *Any increase in 6 dB or more, due to the potential for adverse community response.*
- *When evaluating noise impacts associated with new residential development, exposure to traffic noise in outdoor yard spaces shall not be considered a significant impact.*

8.7.i Continue to enforce the Community Noise Ordinance.

8.7.j Enforce compliance with noise emissions standards for all types of automotive vehicles established by the California Vehicle Code and by federal regulations.

8.7.k Urge AC Transit to use small buses for routes on minor streets as a noise-reduction measure.

8.7.l Maintain day and nighttime truck routes that minimize the number of residents exposed to truck noise.

City of Alameda Noise Ordinance

The City of Alameda's Noise Ordinance, Chapter 4, Article II, from the City's Municipal Code, establishes the following guidelines to help determine what constitutes a violation of the City's Noise Ordinance. The City's maximum exterior noise limits are summarized in Table H-4.

TABLE H-4
MUNICIPAL CODE – CITY OF ALAMEDA EXTERIOR NOISE LEVEL STANDARDS

Receiving Land Use Category	Cumulative Number of Minutes in Any One (1) Hour	Noise Level (dBA)	
		Daytime (7 am – 10 pm)	Nighttime (10 pm – 7 am)
Residential, School, Hospital, Church, Public Library	30	55	50
	15	60	55
	5	65	60
	1	70	65
	0	75	70
Commercial Properties	30	65	60
	15	70	65
	5	75	70
	1	80	75
	0	85	80

Source: Alameda Municipal Code 4-10.4, Tables 1 & 2.

To control noise from construction activities, the City has established noise limits for construction**.** The City's ordinance allows construction during the following times: Monday through Friday from 7 a.m. to 7 p.m. and Saturdays from 8 a.m. to 5 p.m.

Groundborne Vibration

There are no federal, state, or local regulatory standards for groundborne vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, the California Department of Transportation (Caltrans) has developed vibration criteria based on potential structural damage risks and human annoyance. Caltrans-recommended criteria for the evaluation of groundborne vibration levels, with regard to structural damage and human annoyance, are summarized in Table H-5 and Table H-6, respectively. The criteria differentiate between transient and continuous/frequent sources. Transient sources of groundborne vibration include intermittent events, such as blasting, whereas continuous and frequent events would include the operations of equipment, including construction equipment, and vehicle traffic on roadways (Caltrans, 2002, 2004).

The groundborne vibration criteria recommended by Caltrans for evaluation of potential structural damage is based on building classifications, which take into account the age and condition of the building. For residential structures and newer buildings, Caltrans considers a minimum peak particle velocity (ppv) threshold of 0.25 inches per second (in/sec) for transient sources and 0.04 in/sec for continuous/frequent sources to be sufficient to protect against building damage. Continuous groundborne vibration levels below approximately 0.02 in/sec ppv are unlikely to cause damage to any structure. In terms of human annoyance, continuous vibrations in excess of 0.04 in/sec ppv and transient sources in excess of 0.25 in/sec ppv are identified by Caltrans as the minimum perceptible level for ground vibration. Short periods of ground vibration in excess of 2.0 in/sec ppv can be expected to result in severe annoyance to people. Short periods of ground vibration in excess of 0.1 in/sec ppv (0.2 in/sec ppv within buildings) can be expected to result in increased levels of annoyance (Caltrans, 2002, 2004).

TABLE H-5
DAMAGE POTENTIAL TO BUILDINGS AT VARIOUS GROUNDBORNE VIBRATION LEVELS

Structure and Condition	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely Fragile Historic Buildings, Ruins, Ancient Monuments	0.12	0.08
Fragile Buildings	0.2	0.1
Historic and Some Old Buildings	0.5	0.25
Older Residential Structures	0.5	0.3
New Residential Structures	1.0	0.5
Modern Industrial/Commercial Buildings	2.0	0.5

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: Caltrans, 2006

TABLE H-6
ANNOYANCE POTENTIAL TO PEOPLE AT VARIOUS GROUNDBORNE VIBRATION LEVELS

Human Response	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely Perceptible	0.04	0.01
Distinctly Perceptible	0.25	0.04
Strongly Perceptible	0.9	0.10
Severe	2.0	0.4

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: Caltrans 2006

2. IMPACTS AND MITIGATION MEASURES

This section describes the criteria used to determine significant noise impacts to sensitive uses, and discusses the potential impacts. The impacts and their associated mitigation measures are presented in the following order: construction-period impacts, followed by operational-period impacts and traffic-related impacts.

a) Significance Criteria

Standards of Significance

The following criteria were used to determine if the project would result in a significant noise impact (based on State CEQA Guidelines Appendix G):

1) Exposure of persons to, or generation of, noise levels in excess of standards established in the local plans or ordinances.

2) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

3) A substantial permanent increase in ambient noise levels in the project vicinity above levels without the project.

4) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

5) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, where the project would expose people residing or working in the area to excessive noise levels. For a project within the vicinity of a private airstrip, where the project would expose people residing or working in the project area to excessive noise levels.

Generally, a project may have a significant effect on the environment if it will substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. More specifically, a noise

impact may be considered significant if it would generate noise that would conflict with local project criteria or ordinances or substantially increase noise levels at noise-sensitive land uses.

b. Less than Significant Impacts

(1) Long Term Aircraft Noise Impacts

As described above, the North Park Street Code area experiences aircraft overflights from the nearby Metropolitan Oakland International Airport (MOIA) and San Francisco International Airport (SFO). Although distinguishable, aircraft overflights generate lower noise levels than other major sources discussed above. Aircraft noise is estimated to be below the 60 dBA CNEL standard recommended for such noise-sensitive uses. The Health and Safety Element of the Alameda *General Plan* indicates that single-family homes and other sensitive land uses (schools, hotels, new/replacement multi-family dwellings) require acoustical study when located within the 60 dBA CNEL. Standard design characteristics for commercial/office buildings would reduce the aircraft noise to a less-than-significant level. Therefore, audible aircraft noise would not generate significant impacts on the proposed land uses and no mitigation would be required.

c. Significant Impacts

(1) Construction Period Impacts

Impact NOISE-1: Buildout of the North Park Street Code could result in demolition, construction, and remodeling activities which could generate annoying noise or groundborne vibrations at neighboring land uses.

Construction activities associated with buildout of the North Park Street Code would involve building demolition, building construction, and utility and roadway reconstruction, which would create noise and vibration. Construction associated with buildout of the North Park Street Code may require the use of pile drivers and earthmovers (e.g., dozers, scrapers, loaders and graders). Pile driving equipment is noisier and, due to its repetitive nature, more annoying than other types of construction equipment. Noise from construction activities would be intermittent during construction and would gradually occur over an extended period of time, driven by market conditions.

When noise levels generated by construction operations are being evaluated, activities occurring during the more noise-sensitive nighttime hours (i.e., 10 p.m. to 7 a.m.) are of increased concern. Because exterior ambient noise levels typically decrease during the nighttime hours as community activities (e.g., commercial activities, vehicle traffic) decrease, construction activities performed during these more noise-sensitive periods of the day can result in increased annoyance and potential sleep disruption for occupants of nearby residential dwellings.

Noise levels during construction activities in association with the operation of heavy equipment would be subject to the provision set forth in the City Ordinance regarding construction noise and only be allowed

to operate during the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday, and 8:00 a.m. and 5:00 p.m. on Saturdays.

In order to ensure that demolition construction and remodeling activities do not create excessive noise or vibrations during the daytime period, the following mitigation measure is recommended.

> **Mitigation Measure NOISE-1:** Developers and/or contractors shall create and implement development-specific noise reduction plans, which shall be enforced via contract specifications. The plan for attenuating construction-related noises shall be implemented prior to the initiation of any work that triggers the need for such a plan. If pile driving is required, "vibratory" pile driving should be used wherever feasible. The vibratory pile driving technique, despite its name, does not generate vibration levels higher than the standard pile driving technique. It does, however, generate lower, less-intrusive noise levels.

Impact NOISE-2: New development associated with implementation of the North Park Street Code could expose existing and/or new residences or other sensitive receptors to noise from stationary sources and traffic related noise that may exceed levels deemed acceptable.

New commercial, retail, or other non-residential development could produce stationary-source noises that could affect existing residences or noise-sensitive land uses. In addition, new residential uses may establish themselves in areas where the proposed mixed use land use designation would prohibit new heavy industrial uses, but would allow existing industrial uses to remain until the use terminates or the site is redeveloped and would allow other commercial and light industrial uses.

The City's Community Noise Ordinance, Section 11 of the Municipal Code, identifies maximum allowable noise levels for commercial uses during daytime and nighttime hours. According to the Ordinance, the maximum instantaneous noise level that may not be exceeded between 7:00 a.m. and 10:00 p.m. is 85 dBA L_{max}. This standard is lower for the hours from 10:00 p.m. to 7:00 a.m., when the maximum instantaneous noise level is 80 dBA L_{max}. For longer duration noise occurrences (defined as more than 1 second in any 1 hour), a range of lower maximum allowable noise level standards apply. The majority of noise occurrences fall in this longer duration category, and instantaneous noise levels are not the primary focus of the City's community Noise Ordinance.

Conventional design of office and commercial buildings would provide 20 to 25 dBA in exterior to interior noise reduction when windows and doors are closed. This range of noise reduction would help reduce the single event exposure as well as long-term averaged noise levels. Noise inside these buildings would not likely exceed noise standards designed for commercial uses.

The Park Street plan area is located at a major gateway to the City where traffic related noise could cause unacceptable noise levels for new residents living in mixed use buildings on Park Street or in buildings located on the Clement Avenue truck route within the plan area. The construction of the Clement Avenue extension from Sherman to Tilden will increase use of the Clement Truck route and increase

noise levels on Clement Avenue and Tilden Way. Predicted change in future traffic noise levels is provided in **Table H-7.**

TABLE H-7
PREDICTED CHANGE IN FUTURE TRAFFIC NOISE LEVELS

Roadway	Segment		CNEL/Ldn at 50 FT from Near Travel Lane Centerline	
			Existing	2030 versus Existing Conditions
	From	To		
Future Clement Ext/Clement	Atlantic	Tilden	54.17	+7.28
Lincoln	5th	Park	61.49	+1.48
Park	Otis	Blanding	61.76	+0.89
Tilden	Lincoln/Park	Blanding/Fernside	62.94	+2.92
Broadway	Otis	Tilden	58.15	+1.74

Source: Transportation Element Update EIR: Ambient Air Quality and Noise Consulting 2008

As shown in the table above, the increases in noise levels on Park Street and Tilden are not expected to be significant, but with the Clement Extension project, noise levels are expected to increase significantly on Clement Street.

Although the Park Street Code is not responsible for the Clement Extension, actions will be needed to ensure that new residential developments on Clement Street and elsewhere in the plan area are designed to protect sensitive receptors from unacceptable noise. The Alameda *General Plan* Policy 8.7.e requires acoustical analysis for new or replacement dwellings, hotels, and schools within the projected CNEL 60 dBA contour, or one-family dwellings not constructed as part of a subdivision requiring a final map within the projected CNEL 65 dBA contour.

To ensure that the appropriate noise mitigation measures are incorporated into each individual development project so that sensitive receptors are not significantly impacted by noise, the following mitigation measure shall be implemented:

Mitigation Measure NOISE-2: New residential or noise-sensitive developments in the North Park Street Code shall be required to conduct acoustical studies, describing how the exterior and interior noise level standards will be met for the Project as well as any impacts on adjacent projects. Studies shall satisfy the acoustical requirements of Title 24, part 2, of the California Administrative Code, Noise Insulation Standards, for single family, multiple-family attached, hotels, motels, etc., regulated by Title 24. of the Uniform Building Code. All new projects shall show that they comply with maximum noise levels outlined in the City's Noise Ordinance and the average sound level goals outlined in the City's General Plan.

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